GE Consumer & Industrial Power Protection

ModBus

Communications Protocol for VAT200 AC Drive Series



File No.: Version: 1.A Page: 1

VAT200 AC Drive Series

ModBus Communication Protocol

INSTRUCTION MANUAL

 NOTICE	-	

- 1. Read both this and instruction manuals of VAT200 before using the unit
- 2. Observe the warnings, cautions and other matters described in this manual.
- 3. Make sure that this manual is delivered to the final user.
- 4. The content of this manual can be changed without notice

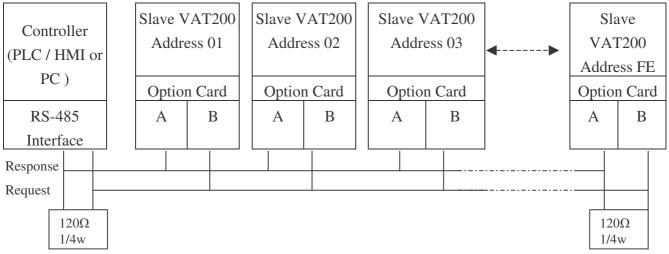
File No.: Version: 1.A Page: 2

1. Communication Data Frame

VAT200 series inverter can be communication controlled by the PC or other controller with the communication protocol, Modbus ASCII Mode & Mode RTU, RS485 or RS232.

Frame length maximum 80 bytes

1.1 Hardware Installation



^{**}It is necessary to connect the terminal impedance (120 Ω , 1/4W) at both ends of the communication wire.**

1.2 Data Frame for ASCII Mode

THE DAVIN I TAMED TOT THE CITETION		
STX(3AH)	Start Byte = 3AH	
Address Hi	Communication Address:	
Address Lo	2-digit ASCII Code	
Function Hi	Function Code (command):	
Function Lo	2-digit ASCII Code	
Command Start Address		
Command Start Address	Command Start byte:	
Command Start Address	4-digit ASCII Code	
Command Start Address		
Data length		
Data length	The length of the command:	
Data length	4-digit ASCII Code	
Data length		
LRC Check Hi	LRC Check Code:	
LRC Check Lo	2-digit ASCII Code	
END Hi	End Byte:	
END Lo	END $Hi = CR(0DH)$, END $Li = LF(0AH)$	

File No.: Version: 1.A Page: 3

Data frame For RTU Mode

MASTER (PLC etc.) send request to SLAVE, whereas SLAVE response to MASTER. The signal receiving is illustrated here.

The data length is varied with the command (Function).

SLAVE Address

Function Code

DATA

CRC CHECK

** The interval should be maintained at 10ms between command signal and request.

Signal Interval

1.3 Slave Address

00H: Broadcast to all the drivers

01H: to the No. 01 Driver 0FH: to the No.15 Driver 10H: to the No.16 Driver

and so on..., Max to No. 254(FEH)

1.4 Function Code

03H: Read the register contents 06H: Write a WORD to register

08H: Loop test

10H: Write several data to register (complex number register write)

2.CMS (Checksum and time-out definition)

2.1 LRC

ex. ADDRESS 01H FUNCTION 03H

COMMAND 01H

00H

DATA LENGTH 0AH

0FH----- true complement

Checksum = F1H

CS(H) = 46H (ASCII)CS(L) = 31H (ASCII)

File No.: Version: 1.A Page: 4

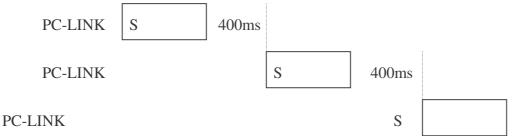
2.2 CRC CHECK:

CRC check code is from Slave Address to end of the data. The calculation method is illustrated as follow:

- (1) Load a 16-bit register with FFFF hex (all1's). Call this the CRC register.
- (2) Exclusive OR the first 8-bit byte of the message with the low-order byte of the 16-bit CRC register, putting the result in the CRC register.
- (3) Shift the CRC register one bit to the right (toward the LSB), Zero-filling the MSB, Extract and examines the LSB.
- (4) (If the LSB was 0): Repeat Steps (3) (another shift) (If the LSB was 1): Exclusive OR the CRC register with the polynomial value A001 hex (1010 0000 0000 0001).
- (5) Repeat Steps (3) and (4) until 8 shifts been performed. When this is done, a complete 8-bit byte will be processed.
- (6) Repeat Steps (2) through (5) for next 8-bit byte of the message, Continue doing this until all bytes have been processed. The final content of the CRC register is the CRC value. Placing the CRC into the message: When the 16-bit CRC (2 8-bit bytes) is transmitted in the message, the low-order byte will be transmitted first, followed by the high-order byte, For example, if the CRC value is 1241 hex, the CRC-16 Upper put the 41h, the CRC-16 Lower put the 12h.

CRC calculation application program

2.3 TIME-OUT (400ms) & RETRY (max. : 2 times)



(When INV (PLC) time-out or detect checksum error, or INV(PLC) response exception code = checksum error, PC-LINK retry maximum two times, and if two times after still error, then display "ERR6")

File No.: Version: 1.A Page: 5

3. Command START ADDRESS

Essentian	Essertian Description	Command	Data length
Function	Function Description	Start Address	(WORD)
	Ladder page1 read	200H	0AH
	Ladder page2 read	20AH	0AH
	Ladder page3 read	214H	0AH
	Ladder page4 read	21EH	0AH
	Ladder page5 read	228H	0AH
	Timer1 Function read	264H	05H
	Timer2 Function read	269H	05H
	Timer3 Function read	26EH	05H
	Timer4 Function read	273H	05H
	Timer5 Function read	278H	05H
	Timer6 Function read	27DH	05H
	Timer7 Function read	282H	05H
	Timer8 Function read	287H	05H
	Counter1 Function read	28CH	04H
	Counter2 Function read	290H	04H
	Counter3 Function read	294H	04H
0.2	Counter4 Function read	298H	04H
03	Encoder1 Function read	2ACH	05H
	Encoder2 Function read	2B1H	05H
	Encoder3 Function read	2B6H	05H
	Encoder4 Function read	2BBH	05H
	Analog1 Function read	2C0H	03H
	Analog2 Function read	2C3H	03H
	Analog3 Function read	2C6H	03H
	Analog4 Function read	2C9H	03H
	Control function read	2CCH	06H
	Contro2 function read	2D2H	06H
	Contro3 function read	2D8H	06H
	Contro4 function read	2DEH	06H
	Contro5 function read	2E4H	06H
	Contro6 function read	2EAH	06H
	Contro7 function read	2F0H	06H
	Contro8 function read	2F6H	06H
	All Coil status read	2FCH~303H	08H

File No.: Version: 1.A Page: 6

Function Function Description	Command	Data length	
1 011001011	T direction Description	Start Address	(WORD)
	Ladder page1 write	200H	0AH
	Ladder page2 write	20AH	0AH
	Ladder page3 write	214H	0AH
	Ladder page4 write	21EH	0AH
	Ladder page5 write	228H	0AH
	Timer1 Function write	264H	04H
	Timer2 Function write	269H	04H
	Timer3 Function write	26EH	04H
	Timer4 Function write	273H	04H
	Timer5 Function write	278H	04H
	Timer6 Function write	27DH	04H
	Timer7 Function write	282H	04H
	Timer8 Function write	287H	04H
	Counter1 Function write	28CH	03H
	Counter2 Function write	290H	03H
	Counter3 Function write	294H	03H
10	Counter4 Function write	298H	03H
	Encoder1 Function write	2ACH	04H
	Encoder2 Function write	2B1H	04H
	Encoder3 Function write	2В6Н	04H
	Encoder4 Function write	2BBH	04H
	Analog1 Function write	2C0H	03H
	Analog2 Function write	2C3H	03H
	Analog3 Function write	2C6H	03H
	Analog4 Function write	2C9H	03H
	Control function write	2CCH	06H
	Contro2 function write	2D2H	06H
	Contro3 function write	2D8H	06H
	Contro4 function write	2DEH	06H
	Contro5 function write	2E4H	06H
	Contro6 function write	2EAH	06H
	Contro7 function write	2F0H	06H
	Contro8 function write	2F6H	06H
	Coil status write	2FCH	01H
	RUN & Stop(PLC)	330H	1
06	All memory clear (Clear PLC Memory)	331H	1
	PASSWORD	332H	1

Note: 'Write Ladder page write' and 'Clear all memory' are not available under PLC running mode.

File No. : Version : 1.A Page : 7

4. Exception Code

ASCII Mode

STX	·.·
A 11	' 0'
Address	' 1'
	' 8'
Function	' 6'
Exception	' 5'
code	'1'
	' 2'
LRC Check	' 8'
END	'CR'
END	'LF'

RTU Mode

SLAVE Address		02H
Function		83H
Exception code		52H
	High	СОН
CRC-16	Low	CDH

Under communication linking, the driver responses the Exception Code and send Function Code AND 80H to main system if there is error happened.

Exception Code	Description
51	Function Code Error
52	Register Encoding Error
53	Data Quantity Error
54	DATA Setting Error
55	Write Mode Error

File No.: Version: 1.A Page: 8

5. Command Start Address Description

5.1 Ladder (*) page read

ASCII Mode

 $PC \rightarrow INV (PLC)$

PC 7 INV (PLC)		
ЗАН	STX	
30H	A 11	
31H	Address	
30H	Francisco Codo	
33H	Function Code	
30H		
32H	*Register	
30H	Number	
30H		
30H		
30H	Data Lanath	
30H	Data Length	
41H		
?	CHECK CLIM	
?	CHECK SUM,	
0DH	END	
0AH	END	

INV (PLC)→PC

INV (LC) /IC		
ЗАН	STX	
30H	A 11	
31H	Address	
30H		
33H	Function Code	
31H	Data length	
34H	(Byte)	
Send out the data from		
PLC[0]~PLC[19], total 40 Byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

RTU Mode

 $PC \rightarrow INV(PLC)$

	/	
01H	Address	
03H	Function Code	
02H	V.D. ' A. N. 1	
00H	* Register Number	
00H	D . 1 . 1	
0AH	Data length	
	CRC High order digits	
	CRC Low order digits	
·		

01H	Address
03H	Function Code
14H	Data length
Sent out the data from PLC[0]~PLC[19],	
total 20 Byte	
?	CRC High order digits
?	CRC Low order digits

File No.: Version: 1.A Page: 9

5.2 Function block read

5.2.1 Timer function block read

PC →INV (PLC)

PC 7INV (PL	C)
ЗАН	STX
30H	A 11
31H	Address
30H	E
33H	Function Code
30H	
32H	*Register
36H	Number
34H	
30H	
30H	Doto I anoth
30H	Data Length
35H	
?	CHECK CHM
?	CHECK SUM,
0DH	END
0AH	END

ASCII Mode

INV (PLC)→PC

IIVV (I LC) /I C		
3AH	STX	
30H	A 11	
31H	Address	
30H	F .: C 1	
33H	Function Code	
30H	Data length	
41H	(Byte)	
*Send out the data from		
PLC[200]~PLC[209], total 20 Byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

RTU Mode

$PC \rightarrow INV (PLC)$

01H	Address	
UIII	Addiess	
03H	Function Code	
02H	*Dagistan Cada	
64H	*Register Code	
00H	Data I an ath	
05H	Data Length	
	CRC High order digit	
	CRC Low order digit	

INV(PLC)→PC

nv(rec) /re		
Address		
Function Code		
Data Length		
*Send out the data from PLC[200]~PLC[209],		
total 10 Byte		
CRC High order digit		
CRC Low order digit		

File No.: Version: 1.A Page: 10

5.2.2 Counter function block read

ASCII Mode

PC →INV (PLC)

PC →INV (PLC)			
ЗАН	STX		
30H	A 11		
31H	Address		
30H	F .: C 1		
33H	Function Code		
30H			
32H	*Register		
38H	Number		
43H			
30H			
30H	Doto I an atla		
30H	Data Length		
34H			
?	CHECK CLIM		
?	CHECK SUM,		
0DH	END		
0AH	END		

INV (PLC) \rightarrow PC

PLC[280]~PLC[287], total 16 Byte		

RTU Mode

 $PC \rightarrow INV(PLC)$

01H	Address	
03H	Function Code	
02H	*Register Code	
8CH		
00H	Data Length	
04H		
	CRC High order digit	
	CRC Low order digit	

01H	Address	
03H	Function Code	
08H	Data Length	
*Send out the data from		
PLC[280]~PLC[287], total 8 Byte		
?	CRC High order digit	
?	CRC Low order digit	

File No.: Version: 1.A Page: 11

5.2.3 Encoder function block read

ASCII Mode

 $PC \rightarrow INV(PLC)$

3AH STX 30H Address 31H Function Code 33H *Register 41H Number 43H 30H 30H Data Length 35H ? CHECK SUM, ODH END OAH END	PC 7INV(PLC)			
31H Address 30H Function Code 33H *Register 41H Number 43H 30H 30H 30H 30H Data Length 35H ? ? CHECK SUM, 0DH END	ЗАН	STX		
31H 30H 33H Function Code 33H 30H 32H *Register Number 43H 30H 30H 30H 30H 30H 7 CHECK SUM, ODH END	30H	A 444		
33H Function Code	31H	Address		
33H 30H 32H *Register Number 41H Number 43H 30H 30H 30H 30H 7 CHECK SUM, 9 ODH END	30H			
32H	33H	Function Code		
41H Number 43H 30H 30H 30H 30H 35H ? CHECK SUM, ODH END	30H			
43H 30H 30H 30H 30H 35H ? CHECK SUM, ? ODH END	32H	*Register		
30H 30H 30H 30H 35H ? CHECK SUM, ODH END	41H	Number		
30H 30H 30H 35H ? CHECK SUM, ODH END	43H			
Data Length 30H 35H ? CHECK SUM, ODH END	30H			
30H 35H ? CHECK SUM, ODH END	30H			
? CHECK SUM, ? END	30H	Data Length		
? CHECK SUM, ODH END	35H			
? 0DH END	?			
	?	CHECK SUM,		
0AH END	0DH	END		
	0AH	END		

 $INV(PLC) \rightarrow PC$

11 (120) 710		
STX		
A 11		
Address		
Function Code		
Data Length		
(Byte)		
ne data from		
PLC[344]~PLC[353], total 20 Byte		
CHECK		
SUM,		
END		
END		

RTU Mode

 $PC \rightarrow INV(PLC)$

TC / HVV(TLC)		
01H	Address	
03H	Function Code	
02H	*Register Code	
ACH		
00H	Data Length	
05H		
	CRC High order digit	
	CRC Low order digit	

	11 (1 LC) /1 C	
01H	Address	
03H	Function Code	
0AH	Data Length	
*Send out the data from		
PLC[344]~PLC[353], total 10 Byte		
?	CRC High order digit	
?	CRC Low order digit	

File No. : Version : 1.A Page : 12

5.2.4 Analog function block read

ASCII Mode

PC	\rightarrow	INV	(PI	C
\perp		TT 4 A 1		\sim

PC 7 INV(PLC)	
ЗАН	STX
30H	A 11
31H	Address
30H	Evention Code
33H	Function Code
30H	
32H	*Register
43H	Number
30H	
30H	
30H	Doto I an atla
30H	Data Length
33H	
?	CHECK SIM
?	CHECK SUM,
0DH	END
0AH	END

$INV(PLC) \rightarrow PC$

STX	
A 11	
Address	
Function Code	
Data Length	
(Byte)	
*Send out the data from	
PLC[384]~PLC[389], total 12 Byte	
CHECK	
SUM,	
END	
END	

RTU Mode

$PC \rightarrow INV(PLC)$

111 / (1 T	1C)	
01H	Address	
03H	Function Code	
02H	*D '	
СОН	*Register Code	
00H		
03H	Data Length	
	CRC High order digit	
	CRC Low order digit	

IIVV(I LC) /I C	
01H	Address
03H	Function Code
06H Data Length	
**Send out the data from	
PLC[384]~PLC[389], total 12	
Byte	
?	CRC High order
	digit
?	CRC Low order
	digit

File No.: Version: 1.A Page: 13

5.2.5 Control function block read

ASCII Mode

 $PC \rightarrow INV(PLC)$

TC / HVV(LC)	
ЗАН	STX
30H	A 11
31H	Address
30H	F .: C 1
33H	Function Code
30H	
32H	*Register
43H	Number
43H	
30H	
30H	Data Lanath
30H	Data Length
36H	
?	CHECK CLIM
?	CHECK SUM,
0DH	END
0AH	END

 $INV(PLC) \rightarrow PC$

11 (120) 110	
STX	
A 11	
Address	
Function Code	
Data Length	
(Byte)	
*Send out the data from	
PLC[408]~PLC[419], total 24 Byte	
CHECK	
SUM,	
END	
END	

RTU Mode

 $PC \rightarrow INV(PLC)$

TC / H((TEC)	
01H	Address
03H	Function Code
02H	*Register Code
ССН	
00H	Data Length
06H	
	CRC High order digit
	CRC Low order digit

1111(1120) 710	
01H	Address
03H Function Code	
0CH	Data Length
**Send out the data from	
PLC[408]~PLC[419], total 12 Byte	
?	CRC High order digit
?	CRC Low order digit

File No.: Version: 1.A Page: 14

5.2.6 Coil status read

ASCII Mode

PC →INV (PLC)

PC 7INV (PLC)	
ЗАН	STX
30H	A 11
31H	Address
30H	English Call
33H	Function Code
30H	
32H	*Register
46H	Number
43H	
30H	
30H	Data I amath
30H	Data Length
38H	
?	
?	CHECK SUM,
0DH	END
0AH	END
0DH	

INV	(PLC)	\rightarrow PC
TIAA	$(1 \mathbf{L} \mathbf{C})$	

H((TEC))IC	
STX	
A 11	
Address	
Function Code	
Data Length	
(Byte)	
*Send out the data from	
PLC[504]~PLC[519], total 32 Byte	
CHECK	
SUM,	
END	
END	

RTU Mode

 $PC \rightarrow INV(PLC)$

$\rightarrow INV(PLC)$	~ <i>)</i>
01H	Address
03H	Function Code
02H	*Register Code
FCH	
00Н	Data Length
08H	
	CRC High order digit
	CRC Low order digit

11(12)	c) / 1 C		
01H	01H Address		
03H	Function Code		
10H	Data Length		
*Send out the data			
from			
PLC[504]~PLC[519],			
	total 16 Byte		
9	CRC High order		
?	digit		
0	CRC Low order		
?	digit		

File No.: Version: 1.A Page: 15

5.3 Ladder page write

$PC \rightarrow INV(PLC)$

TC / HVV(LC)		
3AH	STX	
30H	Address	
31H	Address	
31H	Function Code	
30H	Tunction Code	
30H		
32H	*Register Number	
30H	Register Number	
30H		
30H		
30H	Data Length	
30H	(Byte)	
41H		
31H	DATA	
34H	DATA	
*Send out the data from PLC[0]~PLC[19], total 40 Byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

ASCII Mode

$INV(PLC) \rightarrow PC$

INV(ILC) /IC	
3AH	
30H	A ddmaga
31H	Address
30H	Function Code
33H	Function Code
30H	*Register Number
32H	
30H	
30H	
30H	Data Langth
30H	
30H	Data Length
41H	
?	CHECK
?	SUM,
0DH	END
0AH	END

RTU Mode

$PC \rightarrow INV(PLC)$

01H	Address	
10H	Function Code	
02H	*Register Code	
00H	Register Code	
00H	Data Length	
0AH		
14H	DATA	
*end out the data from PLC[0]~PLC[19], total 20 Byte		
	CRC High order digit	
	CRC Low order digit	

()	
01H	Address
03H	Function Code
02H	* Register Code
00H	
00H	Data Length
0AH	
?	CRC High order digit
?	CRC Low order digit

File No.: Version: 1.A Page: 16

5.4 Function block write

5.4.1 Timer function block write

ASCII Mode

PC →INV(PLC)

PC 7INV(PLC)		
3AH	STX	
30H	A diduana	
31H	Address	
31H	Function Code	
30H		
30H		
32H	*Register	
36H	Number	
34H		
30H		
30H	Data Length	
30H	(Byte)	
34H		
30H	DATA	
38H	DATA	
*Send out the data from		
PLC[200]~PLC[207], total 16 Byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

$INV(PLC) \rightarrow PC$

INV(PLC) 7	C
3AH	
30H	Address
31H	Address
31H	Function Code
30H	
30H	
32H	* Register
36H	Number
34H	
30H	
30H	Data Length
30H	Data Length
34H	
?	CHECK
?	SUM,
0DH	END
0AH	END
0AH	END

$PC \rightarrow INV (PLC)$

10H Address 10H Function Code 02H *Register Code 64H Data Length 04H DATA *Send out the data from PLC[200]~PLC[207], total 8 Byte ? CRC High order digits	10 / 11	(I DC)	
02H *Register Code 64H Data Length 04H DATA *Send out the data from PLC[200]~PLC[207], total 8 Byte	01H	Address	
*Register Code OOH	10H	Function Code	
00H Data Length 04H DATA *Send out the data from PLC[200]~PLC[207], total 8 Byte	02H	*Pagistar Coda	
04H Data Length 08H DATA *Send out the data from PLC[200]~PLC[207], total 8 Byte	64H	Register Code	
08H DATA *Send out the data from PLC[200]~PLC[207], total 8 Byte	00H	Data Langth	
*Send out the data from PLC[200]~PLC[207], total 8 Byte	04H	Data Length	
PLC[200]~PLC[207], total 8 Byte	08H	DATA	
? CRC High order digits			
	?	? CRC High order digits	
? CRC Low order digits	?	CRC Low order digits	

RTU Mode

01H	Address
10H	Function Code
02H	*Register Code
64H	
00H	Data Length
04H	
?	CRC High order digits
?	CRC Low order digits

File No.: Version: 1.A Page: 17

5.4.2 Counter function block write

ASCII Mode

 $PC \rightarrow INV(PLC)$

PC 7 INV(PLC)		
3AH	STX	
30H	Address	
31H	Address	
31H	Function Code	
30H	Function Code	
30H		
32H	*Register Code	
38H	Register Code	
43H		
30H		
30H	Data Length	
30H	(Byte)	
33H		
30H	DATA	
36H	DAIA	
*Send out the data from PLC[280]~PLC[285], total 12 byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

 $INV(PLC) \rightarrow PC$

1111 (1 LC) 7	1 C
3AH	
30H	Address
31H	Address
30H	Function Code
33H	Tunction Code
30H	
32H	*Register Code
38H	Register Code
43H	
30H	
30H	Doto Longth
30H	Data Length
33H	
?	CHECK
?	SUM,
0DH	END
0AH	END

RTU Mode

$PC \rightarrow INV(PLC)$

01H	Address	
10H	Function Code	
02H	*Register Code	
8CH	Register Code	
00H	Data I amath	
03H	Data Length	
06H	DATA	
*Send out the data from PLC[280]~PLC[285], total 6 Byte		
?	CRC High order digits	
?	CRC Low order digits	

01H	Address
10H	Function Code
02H	*Dagistan Cada
8CH	*Register Code
00H	Data I anoth
03H	Data Length
?	CRC High order digits
?	CRC Low order digits

File No.: Version: 1.A Page: 18

5.4.3 Encoder function block write

ASCII Mode

PC →INV(PLC)

3AH STX 30H Address 31H Function Code 30H *Register Code 41H 43H 30H Data Length 30H (Byte) 34H 30H DATA *Send out the data from PLC[344]~PLC[353], total 16 Byte	TC /IIIV(ILC)		
31H Address 31H Function Code 30H 30H 32H *Register Code 41H 43H 30H Data Length 30H (Byte) 34H 30H 38H DATA *Send out the data from	3AH	STX	
31H 31H Function Code 30H 30H *Register Code 41H 43H 30H 30H Data Length (Byte) 34H 30H DATA *Send out the data from	30H	Address	
30H 30H 32H *Register Code 41H 43H 30H 30H 30H 30H 30H 34H 30H 30H 34H 30H 38H DATA *Send out the data from	31H		
30H 30H 30H 32H 41H 43H 30H 30H 30H Bota Length (Byte) 34H 30H 30H DATA *Send out the data from	31H	Function Code	
32H	30H	Tunction Code	
#Register Code	30H		
41H	32H	*Pagistar Code	
30H Data Length (Byte) 34H 30H DATA 38H	41H	Register Code	
30H Data Length (Byte) 34H 30H DATA *Send out the data from	43H		
30H (Byte) 34H 30H DATA *Send out the data from	30H	1	
34H 30H DATA 38H *Send out the data from	30H		
30H DATA 38H *Send out the data from	30H		
*Send out the data from	34H		
*Send out the data from	30H	DATA	
	38H	DATA	
? CHECK	?	CHECK	
? SUM,	?	SUM,	
0DH END	0DH	END	
0AH END	0AH	END	

INV	(PLC)	\rightarrow PC
TT 4 4	$(\mathbf{L} \mathbf{L} \mathbf{C})$	110

e
le
iC

RTU Mode

 $PC \rightarrow INV(PLC)$

TC / HVV(LC)		
01H	Address	
10H	Function Code	
02H	*Pagistar Coda	
ACH	*Register Code	
00H	Data Langth	
04H	Data Length	
08H	DATA	
* Send out the data from PLC[344]~PLC[353], total 8 Byte		
?	CRC High order digits	
?	CRC Low order digits	

	/
01H	Address
10H	Function Code
02H	*Pagistar Coda
ACH	*Register Code
00H	Data Langth
04H	Data Length
?	CRC High order digits
?	CRC Low order digits

File No.: Version: 1.A Page: 19

5.4.4 Analog function block write

ASCII Mode

 $PC \rightarrow INV(PLC)$

PC 7 INV(PLC)		
3AH	STX	
30H	Address	
31H	Address	
31H	Function Code	
30H	Tunction Code	
30H		
32H	*Register Code	
43H	Register Code	
30H		
30H		
30H	Data Length	
30H	(Byte)	
33H		
30H	DATA	
36H	DATA	
* Send out the data from PLC[384]~PLC[389], total 12 Byte		
?	CHECK	
?	SUM,	
0DH	END	
0AH	END	

 $INV(PLC) \rightarrow PC$

INV(PLC) >1	
3AH	
30H	Address
31H	Address
30H	Function Code
33H	Function Code
30H	
32H	*Pagistar Cada
43H	*Register Code
30H	
30H	
30H	Data Length
30H	
33H	
?	CHECK
?	SUM,
0DH	END
0AH	END

RTU Mode

 $PC \rightarrow INV(PLC)$

01H	Address	
10H	Function Code	
02H	*Dagistar Codo	
C0H	*Register Code	
00H	Data Lanath	
03H	Data Length	
06H	DATA	
* Send out the data from PLC[384]~PLC[389], total 12 Byte		
?	CRC High order digits	
?	CRC Low order digits	

11 ((120)) 1 0		
01H	Address	
10H	Function Code	
02H	*Pagistar Codo	
C0H	*Register Code	
H00	Data Langth	
03H	Data Length	
?	CRC High order digits	
?	CRC Low order digits	

File No.: Version: 1.A Page: 20

5.4.5 Control function block write

ASCII Mode

 $PC \rightarrow INV(PLC)$

STX Address Function Code		
Function Code		
runction code		
*Register Code		
Register Code		
Data Length		
(Byte)		
DATA		
DATA		
* Send out the data from PLC[408]~PLC[419], total 24 Byte		
CHECK		
SUM,		
END		
END		

 $INV(PLC) \rightarrow PC$

INV(PLC) 7	
3AH	
30H	Address
31H	Address
30H	Function Code
33H	Tunction Code
30H	
32H	*Register Code
43H	Register Code
43H	
30H	
30H	Doto Longth
30H	Data Length
36H	
?	CHECK
?	SUM,
0DH	END
0AH	END

RTU Mode

$PC \rightarrow INV(PLC)$

	LC)		
01H	Address		
10H	Function Code		
02H	*Dagistar Cada		
ССН	*Register Code		
00H	Data Laurath		
06H	Data Length		
0CH	DATA		
	out the data from LC[419], total 12 Byte		
?	CRC High order digits		
?	CRC Low order digits		

11 (120) 710					
01H	Address				
10H	Function Code				
02H	*Register Code				
ССН	Register Code				
00H	Data Langth				
03H	Data Length				
?	CRC High order digits				
?	CRC Low order digits				

File No.: Version: 1.A Page: 21

5.4.6 Coil status write

ASCII Mode

 $PC \rightarrow INV(PLC)$

1 C / HV(I LC)	
3AH	STX
30H	A ddmaga
31H	Address
30H	F
36H	Function Code
30H	
32H	* Dagistan Cada
46H	* Register Code
43H	
*Data to be written to	
*Data to be written to	16-Bit data comprising
*Data to be written to	of 4 ASCII codes
*Data to be written to	
?	CHECK
?	SUM
0DH	END
0AH	END

INV(PLC	\rightarrow PC
---------	------------------

3AH	STX	
30H	Addraga	
31H	Address	
30H	Eurotion Codo	
36H	Function Code	
30H		
32H	* Dagistan Cada	
46H	* Register Code	
43H		
*Data to be written to		
*Data to be written to	16-Bit data comprising	
*Data to be written to	of 4 ASCII codes	
*Data to be written to		
?	CHECK	
?	SUM	
0DH	END	
0AH	END	

RTU Mode

01H	Address	
06H	Function Code	
02H	Register Code	
FCH		
*Data to be written to	16-Bit data	
*Data to be written to	10-Dit data	
?	CRC High order digits	
?	CRC Low order digits	

01H	Address	
06H	Function Code	
02H	Register Code	
FCH		
*Data to be written to	16-Bit data	
*Data to be written to	10-Dit data	
?	CRC High order digits	
?	CRC Low order digits	

note:	Write to Coil	Start code
	INPUT	02FDH
	TIMER	02FEH
	COUNTER	02FFH
	Aux. coil	0300H
	Control coil	0301H
	ANALOG	0302H
	ENCODER	0302H
	OUTPUT	0303H

File No. : Version : 1.A Page : 22

5.5 Inverter Control

5.5.1 Command DATA (Readable and Writable)

Register Code		Bit	Content
0100H	Rea	dy-to-u	se
		0	Operation Command 1 : Run 0 : Stop
		1	Reverse Command 1 : Reverse 0 : Forward
		2	External Fault 1 : Fault (EFO)
		3	Fault Reset 1 : Reset
	Signal	4	Log Command 1 : Log
	s u	5	Multi function Command S1 1:"ON" (Define 5-00 Function)
	peration	6	Multi function Command S2 1:"ON" (Define 5-01 Function)
	Ope	7	Multi function Command S3 1:"ON"(Define 5-02 Function)
0101H		8	Multi function Command S4 1:"ON"(Define 5-03 Function)
		9	Multi function Command S5 1:"ON"(Define 5-04 Function)
		A	Multi function Command S6 1:"ON"(Define 5-05 Function)
		В	Multi function Command AIN 1 :"ON"(Define 5-06 Function)
		С	Multi function Command 1 1: R1A "ON" (Define 8-02
		D	Function)
			Multi function Command 2 1: R2A "ON" (Define 8-03
			Function)
		E-F	(unused)
0102H		Frequer	ncy Command
0103~011FH		Ready-t	o-use

(Note) The unused Bit is defined as 0, the spare register is not available for writing Data.

5.5.2 Supervision Data (Only for reading)

Register code		Bit	Content
		0	Operation State 1 : Run 0 : Stop
	ıal	1	Direction State 1 : Reverse 0 : Forward
012011	Sign	2	Inverter operation prepare state 1: ready 0: unready
0120H	State	3	Abnormal 1 : Abnormal
	St	4	DATA setting error 1 : Error
		5-F	(unused)

(Note) Please define the unused Bit as 0.

File No.: Version: 1.A Page: 23

Register code	Content					
110915501 00010	00 The inverter is normal					
	1	01 Program abnormal(CPF)	24	Under voltage during running (LV-C)		
		02 EEPROM abnormal (EPR)		25 ~ 28 (unused)		
		03 Over voltage (OV)	29	(Err8)		
		04 Under voltage(LV)	30	Stop at 0 Hz(STP0)		
		05 Inverter over heat (OH)	31	, ,		
		06 ~ 09 (unused)	32	Control panel emergency stop (STP2)		
		Over current during decelerating (OC-D)	33	Emergency stop (E.S)		
	t	Over current during accelerating (OC-A)	34	External BB(bb)		
0121H	Error content	Over current at constant speed (OC-C)	35	Auto testing error(ATER)		
012111	Error o	Over voltage at constant speed / decelerating (OV-C)	36	PID feedback signal loss(PDER)		
	I	Inverter over heat at constant speed (OH-C)		Communication error(EFO)		
		15 Inverter over speed (OVSP)	_	Encoder signal loss (ECER) *1		
		16 CPU interrupted (CTER)		Analog converting error(Err4)		
		17 (OC_S)		Parameter locked(LOC)		
		18~19 (Unused)		Keypad operation error (Err1)		
		20 Over current at stop(OC)		Parameter setting error (Err2)		
		21 Motor over load (OL1)	43	Modifying the parameter in communication (Err5)		
		22 Inverter over load (OL2)		Communication failure (Err6)		
		23 Over torque detected (OL3)		Parameter setting error (Err7)		
	o)		: OF			
	alu		: OF			
	ıt v		: OF			
	uent input value		: OF			
	nt i		: OF			
0122H	dne		: OF			
	Sequ					
		7-9				
	nal	A Multifunction output 1(RELAY1) (1 : R1A ON 0 : R1A OFF)				
	Terminal output	B Multifunction output 2(RELAY	2) (1	: R2A ON 0 : R2A OFF)		
0.1.0						
0123H	Frequency command					
0124H	Output frequency					
0125H	Output voltage command (1/1V)					
0126H	Output DC voltage command (1/1V)					

(Note) Please define the unused Bit as 0.

File No.: Version: 1.A Page: 24

Register Code	Content
0127H	Output current (10/1A)
0128H	Reserved
0129Н	Output torque
012AH	PID Feedback value (100% / Max output frequency, 10/1%)
012BH	PID input value (100% / Max output frequency, 10/1%, sign attached)
012CH	TM2 AIN input value (1024 / 10V) *1
012DH	TM2 AV2 input value (1024 / 10V) *1
012EH-012FH	Ready-to-use

(Note:) The ready-to-use register is not available for the data write.

File No.: Version: 1.A Page: 25

5.5.3 Read the data in the holding register [03H]

Continuously read the data in the register from the specified address.

(e.g.) Read the frequency command from the SLAVE 1, inverter VAT200.

ASCII Mode

Command	Signal

Comman	Command Signal		
3AH	STX		
30H	SLAVE		
31H	Address		
30H	Function		
33H	Code		
30H			
31H	Start to		
32H	encode		
33H			
30H			
30H	Data		
30H	Data		
31H			
?	LRC CHECK		
?	LKC CHECK		
0DH	END		
0AH	END		

Respond signal (Normally)

Kespona signai (Normany		
3AH	STX	
30H	SLAVE	
31H	Address	
30H	Function	
33H	Code	
30H	DATA	
32H	Quantity	
31H		
37H	Initial holding	
37H	register	
30H		
?	LRC CHECK	
?	LKC CHECK	
0DH	END	
0AH	END	

Respond signal (Error)

3AH	STX	
30H	SLAVE	
32H	Address	
38H	Function	
33H	Code	
35H	Exception	
32H	Code	
0DH	EMD	
0AH	END	

RTU Mode

Command Signal

Communa Digital		
SLAVE Address		01 H
Function C	lode	03H
Start to	High	01H
encode	Low	23H
Data	High	00H
quantity	Low	01H
CD C 16	High	74H
CRC-16	Low	3CH

Respond signal (Normally)

respond signal (1 tormany)		
SLAVE Address		01H
Function Code		03H
DATA		02H
Initial	High	17H
holding register	Low	70H
CRC-16	High	AFH
	Low	82H

SLAVE Address		02H
Function Code		83H
Exception Code		52H
CRC-16	High	C0H
	Low	CDH

File No.: Version: 1.A Page: 26

5.5.4 LOOP BACK CHECK [08H]

The check code checking the transmission of the signal between MASTER and SLAVE could be discretionary.

ASCII Mode

Command	Signa	1
Communana	012110	ш

Comman	Command Signal	
3AH	STX	
30H	SLAVE	
31H	Address	
30H	Function	
38H	Code	
30H		
30H	Chaolr Codo	
30H	Check Code	
30H		
41H		
35H	DATA	
33H		
37H		
?	LRC CHECK	
?	LKC CHECK	
0DH	END	
0AH	END	

Respond	signal	(Normally

3AH STX 30H SLAVE 31H Address 30H Function 38H Code 30H Check Code 30H ODH 30H DATA 33H ODH 2 LRC CHECK 0DH OAH END	Respond signal (Normally		
31H Address 30H Function 38H Code 30H Check Code 30H ODH Address Function Check Code ODH Address Check Code Address Check Code	3AH	STX	
30H	30H	SLAVE	
38H Code 30H 30H 30H 30H 30H 41H 35H 35H 37H ? LRC CHECK 0DH END	31H	Address	
30H 30H 30H 30H 30H 41H 35H 33H 37H ? LRC CHECK 0DH END	30H	Function	
30H 30H 30H 30H 41H 35H 35H 37H ? LRC CHECK 0DH END	38H	Code	
30H 30H 41H 35H 33H 37H ? LRC CHECK ODH END	30H		
30H 30H 41H 35H DATA 33H 37H ? LRC CHECK 0DH END	30H	Chaola Cada	
41H 35H	30H	Check Code	
35H DATA 33H 37H ? LRC CHECK ? ODH END	30H		
33H 37H ? LRC CHECK ? 0DH END	41H		
37H ? LRC CHECK ? ODH END	35H	DATA	
? LRC CHECK ODH END	33H		
? LRC CHECK ODH END	37H		
? ODH END	?	I DC CHECV	
I END	?	LKC CHECK	
0AH END	0DH	END	
	0AH	END	

Respond signal (Error)

tespond signal (Litor)		
3AH	STX	
30H	SLAVE	
31H	Address	
38H	Function	
38H	Code	
32H	Exception	
30H	Code	
?	I DC CHEC	
?	LRC CHEC	
0DH	EMD	
0AH	END	

RTU Mode

Command Signal

SLAVE Address		01 H
Function Code		08H
Check	High	00H
Code	Low	00H
DATA	High	A5H
	Low	37H
CRC-16	High	DAH
	Low	8DH

Respond signal (Normally)

tespona signai (i torinarij)		
SLAVE Address		01H
Function Code		08H
Check	High	00H
Code	Low	00H
DATA	High	A5H
	Low	37H
CRC-16	High	DAH
	Low	8DH
·		

Respond signal (Error)

	0	/
SLAVE Address		01H
Function Code		88H
Exception Code		20H
CRC-16	High	47H
	Low	D8H

File No.: Version: 1.A Page: 27

5.5.5Write to the holding register [06H]

Write the specified data to the holding register from the defined address. (e.g.) write the frequency command 60.0Hz from PLC to SLAVE 1, inverter VAT200.

ASCII Mode

Command Signal		
3AH	STX	
30H	SLAVE	
31H	Address	
30H	Function	
36H	Code	
30H		
31H	Start to	
30H	encode	
32H		
31H		
37H	DATA	
37H		
30H		
?	LRC CHECK	
?	LKC CHECK	
0DH	END	
0AH	END	

Respond	cional ((Normally)
Respond	Signai ((INOTHIAITY

Respond signal (Normally		
3AH STX		
30H	SLAVE	
31H	Address	
30H	Function	
36H	Code	
30H		
31H	Start to	
30H	encode	
32H		
31H		
37H	DATA	
37H		
30H		
?	I DC CHECK	
?	LRC CHECK	
0DH	END	
0AH	END	

Respond signal (Error)

respond signal (Elloi)		
3AH	STX	
30H	SLAVE	
31H	Address	
38H	Function	
36H	Code	
35H	Exception	
32H	Code	
?	LRC CHECK	
?	LRC CHECK	
0DH	END	
0AH	END	

RTU Mode

Command Signal

Command Signal		
SLAVE Address		01 H
Function Code		06H
Start to	High	01H
encode	Low	02H
Data	High	17H
Quantity	Low	70H
CDC 16	High	27H
CRC-16	Low	E2H

Respond signal (Normally)

tespona sig	copona signai (1voimany)		
SLAVE Address		01H	
Function Code		06H	
Start to	High	01H	
encode	Low	02H	
Data	High	17H	
Quantity	Low	70H	
CRC-16	High	27H	
	Low	E2H	

SLAVE Address		01H
Function Code		86H
Exception Code		52H
CRC-16	High	СЗН
	Low	9DH

File No.: Version: 1.A Page : 28

5.5.6 Write complex Number holding register [10H]

From the defined code, write the respective specified data to the holding registers. e.g. Input the frequency command 'Running forward at 60.0Hz' into the SLAVE 1 V2 from PLC.

ASCII Mode

Command Signal		
3AH	STX	
30H	SLAVE	
31H	Address	
31H	Function	
30H	Code	
30H		
31H	Start coding	
30H	Start coding	
31H		
30H		
30H	Data quantity	
30H		
32H		
30H	DATA *	
34H	DATA	
30H		
30H	Primary	
30H	DATA	
31H		
31H		
37H	Secondary	
37H	DATA	
30H		
?	LRC CHECK	
?	LKC CHECK	
0DH	END	
0AH		

Respond	l signal	(Normally)	

respond signar (riorman)			
3AH	STX		
30H	SLAVE		
31H	Address		
31H	Function		
30H	Code		
30H			
31H	Start coding		
30H	Start couning		
31H			
30H	Data quantity		
30H			
30H			
32H			
?	LRC CHECK		
?			
0DH	END		
0AH			

respond signal (Littor)			
3AH	STX		
30H	SLAVE		
31H	Address		
39H	Function		
30H	Code		
35H	Exception		
32H	Code		
?	LRC CHECK		
?	LKC CHECK		
0DH	END		
0AH	END		

^{*} DATA Quantity is equal to the Number multiply 2.

File No. : Version : 1.A Page : 29

RTU Mode

Command Signal

SLAVE Address		01 H	
Function	Function Code		
Start to	High	01H	
encode	Low	01H	
Data	High	00H	
quantity	Low	02H	
DATA number *		04H	
Primary	High	00H	
DATA	Low	01H	
Secondary	High	17H	
DATA	Low	70H	
CRC-16	High	60H	
CKC-10	Low	27H	

Respond signal (Normally)

(Troffinally)			
SLAVE Address		01H	
Function	Code	10H	
Start to	High	01H	
encode	Low	01H	
Data	High	00H	
quantity	Low	02H	
CRC-16	High	11H	
CKC-10	Low	F4H	

SLAVE Address		01H
Function Code		90H
Exception Code		52H
CRC-16	High	CDH
CRC-10	Low	FDH

^{* &#}x27;DATA number' is equal to the 'data quantity' multiply 2.

File No.: Version: 1.A Page: 30

Comparison list between parameter and register (as for the parameter description, please refer to the parameter function list)

Register Code	FUNCTION BLOCK	Register Code	FUNCTION BLOCK
0000H	0-0	0023H	3-11
0000H	0-0	0024H	3-12
0001H	0-2	0025H	3-13
0003H	0-3	0026H	3-14
0004H	0-4	0027H	3-15
0005H	0-5	0028H	3-16
0006Н	0-6	0029H	3-17
0007H	0-7	002AH	3-18
0008H	0-8	002BH	3-19
0009H	1-0	002CH	3-20
000AH	1-1	002DH	3-21
000BH	1-2	002EH	3-22
000CH	1-3	002FH	4-0
000DH	1-4	0030H	4-1
000EH	1-5	0031H	4-2
000FH	1-6	0032H	4-3
0010H	1-7	0033H	4-4
0011H	2-0	0034H	4-5
0012H	2-1	0035H	5-0
0013H	2-2	0036Н	5-1
0014H	2-3	0037H	5-2
0015H	2-5	0038H	5-3
0016H	2-6	0039Н	5-4
0017H	2-7	003AH	5-5
0018H	3-0	003BH	5-6
0019H	3-1	003CH	5-7
001AH	3-2	003DH	~
001BH	3-3	003EH	6-0
001CH	3-4	003FH	6-1
001DH	3-5	0040H	6-2
001EH	3-6	0041H	6-3
001FH	3-7	0042H	6-4
0020H	3-8	0043H	6-5
0021H	3-9	0044H	6-6
0022H	3-10	0045H	6-7

File No.: Version: 1.A Page: 31

Register	FUNCTION	Docistor Call	FUNCTION
Code	BLOCK	Register Code	BLOCK
0046H	6-8	0069Н	10-6
0047H	7-0	006AH	10-7
0048H	7-1	006BH	10-8
0049H	7-2	006CH	10-9
004AH	7-3	006DH	11-0
004BH	7-4	006EH	11-1
004CH	7-5	006FH	11-2
004DH	8-0	0070H	11-3
004EH	8-1	0071H	11-4
004FH	8-2	0072H	11-5
0050H	8-3	0073H	11-6
0051H	8-4	0074H	11-7
0052H	8-5	0075H	12-0
0053H	9-0	0076Н	12-1
0054H	9-1	0077H	12-2
0055H	9-2	0078H	12-3
0056H	9-3	0079H	12-4
0057H	9-4	007AH	12-5
0058H	9-5	007BH	12-6
0059H	9-6	007CH	13-0
005AH	9-7	007DH	13-1
005BH	9-8	007EH	13-2
005CH	9-9	007FH	13-3
005DH	9-10	0080H	13-4
005EH	9-11	0081H	14-0
005FH	9-12	0082H	14-1
0060H	9-13	0083H	14-2
0061H	9-14	0084H	14-3
0062H	9-15	0085H	14-4
0063H	10-0	0086Н	15-0
0064H	10-1	0087H	15-1
0065H	10-2	0088H	15-2
0066Н	10-3	0089H	15-3
0067H	10-4	008AH	15-4
0068H	10-5	008BH	15-5

File No.: Version: 1.A Page: 32

Register	FUNCTION	Register Code	FUNCTION
Code	BLOCK	Register Code	BLOCK
008CH	15-6	00AFH	~
008DH		00B0H	~
008EH		00B1H	~
008FH		00B2H	~
0090H	3-23	00B3H	~
0091H	3-24	00B4H	~
0092H	3-25	00B5H	~
0093H	3-26	00B6H	~
0094H	3-27	00B7H	~
0095H	3-28	00B8H	~
0096Н	3-29	00B9H	~
0097H	5-8	00BAH	~
0098H	~	00BBH	~
0099H	2-4	00BCH	~
009AH	2-8	00BDH	~
009BH	~	00BEH	~
009CH	~	00BFH	~
009DH	~	00C0H	~
009EH	~	00C1H	~
009FH	~	00C2H	~
00A0H	~	00C3H	~
00A1H	~	00C4H	~
00A2H	~	00C5H	~
00A3H	~	00C6H	~
00A4H	~	00C7H	~
00A5H	~	00C8H	~
00A6H	~	00C9H	~
00A7H	~	00CAH	~
00A8H	~	00CBH	~
00A9H	~	00CCH	~
00AAH	~	00CDH	~
00ABH	~	00CEH	~
00ACH	~	00CFH	~
00ADH	~	00D0H	~
00AEH	~	00D1H	~

File No.: Version: 1.A Page: 33

FUNCTION

BLOCK

~

~

~

~

Register	FUNCTION	Danistan Cada
Code	BLOCK	Register Code
00D2H	~	00F7H
00D3H	~	00F8H
00D4H	~	00F9H
00D5H	~	00FAH
00D6H	~	00FBH
00D7H	~	00FCH
00D8H	~	00FDH
00D9H	~	00FEH
00DAH	~	00FFH
00DBH	~	~
00DCH	~	
00DDH	~	
00DEH	~	
00DFH	~	
00E0H	~	
00E1H	~	
00E2H	~	
00E3H	~	
00E4H	~	
00E5H	~	
00E6H	~	
00E7H	~	
00E8H	~	
00E9H	~	
00EAH	~	
00EBH	~	
00ECH	~	
00EDH	~	
00EEH	~	
00EFH	~	
00F0H	~	
00F1H	~	
00F2H	~	
00F3H	~	
00F4H	~	
00F5H	~	
00F6H	~	

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